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09/824,211	04/03/2001	Yoshiro Shiokawa	2001-0394A	9109

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EXAMINER	
JOHNSTON, PHILLIP A	
ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 11/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/824,211	Applicant(s) SHIOKAWA, YOSHIRO	
	Examiner Phillip A Johnston	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 April 2001* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Detailed Action

Abstract

1. The abstract of the disclosure is objected to because the word "the" has been omitted in 7 places; for example line 3 "analyze mass of " should be "analyze the mass of ". Correction is required. See MPEP § 608.01(b).

Specification

2. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms, which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: Page 1, line 2 "mass of gas molecule in reduced-pressure" should be "the mass of gas molecules in a reduced-pressure"; line 4 "high-mass molecule" should be "high-mass molecules"; line 8 "called mass filter" should be "called a mass filter"; line 9 "high-sensitivity measurement" should be "high-sensitivity measurements"; line 10 "with small/simple" should be "with a small/simple"; and line 11 "Q-pole type" should be "the Q-pole type".

Claims Rejection – 35 U.S.C. 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being anticipated by U.S. Patent No. 6,111,250 to Thomson.

Regarding Claims 1-5 and 12, Thomson discloses a quadrupole (Q-pole) mass spectrometer that includes RF quadrupole of rods divided into six sections, and the same amplitude RF voltage applied to all sections. Such a segmented quadrupole was utilized as Q0 transmitting ions from an atmospheric pressure ion source 16 into Q1. When the voltage difference along the total length of the rods is zero volts, corresponding to no axial field, approximately 50 milliseconds are required for the ion signal to reach steady state. As the axial field is increased, the time to reach a steady state signal decreases, to about 10 milliseconds with V=5 volts. This corresponded to a gradient of about 5/6 volts per section. The axial field thus permits the use of Q0 at high pressure in a situation where the ions must be transmitted rapidly at steady state from one end of the RF quadrupole Q0 to the other. (as recited in Claims 1 and 2). In this

mode of operation several m/z values can be sequentially monitored at a rapid rate (i.e. 10 milliseconds per m/z value), and in which the RF quadrupole Q0 can transmit each m/z ion from the ion source to the entrance of Q1 with little delay. See Column 8, line 23-34, line 63-67; and Column 9, line 1-14. Thomson also teaches that the axial field of the invention may also be used to alleviate the effects of fringing fields at the entrance and exit of Q1, wherein an axial field can be placed at the entrance and exit to speed up ions as they enter and leave Q1 (as recited in Claims 3, 5 and 12), but to slow down their passage through the center portion of Q1 so that they will undergo more oscillations in the resolving field, thereby increasing the resolution of Q1 (as recited in Claim 4) . This can be accomplished by providing a segmented case or auxiliary rods or electrodes 220 around the resolving or center portion of rods 222, and by adjusting the entrance and exit offsets to speed ions into and out of rod set 222 but adjusting the axial potential created by case or rods 220 to slow down ions during their passage through the center portion of rod set 222. See Column 14, line 28-45, and FIG. 32.

Regarding Claims 6 and 7, Thomson as applied to Claims 1-5 and 12 above, discloses a Quadrupole (Q-pole) mass spectrometer that includes quadrupole rod set where the RF applied equally to all the bands 158-1 to 158-5 is conducted to some extent through the resistive coatings on segments 160 to provide a relatively uniform RF field along the length of the rod 156. However with different DC voltages V1 to V5 applied to the bands, a DC voltage gradient is established along the length of the rod 156. Any desired gradient can be chosen, e.g. a gradient entirely in one direction to speed passage of ions through the rod set, or a gradient having a potential well at the center

(lengthwise) of the rod set, for use in ion containment applications. See Column 11, line 21-32, and Figure 25. It is implied herein that use of the resistive coatings as described above, are equivalent to the use of a "thin film" as recited in Claim 7.

Regarding Claims 8-11, Thomson as applied to Claims 1-7 and 12 above, discloses a Quadrupole (Q-pole) mass spectrometer wherein the axial field in the presence of cooling gas, can be used to provide some separation of ions as they drift through the device under the action of the axial field, while the collisional focusing (as recited in Claim 8 and 9), in the radial direction prevents ions from being lost by diffusion. For example, if ions are admitted into an RF multipole with an axial field, in the presence of cooling gas or drift gas, the ion velocity will reach a constant value, which is proportional to the axial field. Ions of different size will drift at different velocities dependant on their shape, mass and charge, and be separated in time when they reach the exit of the device. If the exit gate (e.g. a lens at exit orifice 192) is opened at an appropriate time, only ions of a certain type will be admitted in the following analyzing device or other detector such as a mass spectrometer. This mobility separation (as recited in Claim 10), may be applied to assist in the analysis of a mixture of ions, where ions of the same or similar masses may have different drift times, thus adding an additional degree of specificity to the analysis. See Column 13, line 20-38. It is well known in the art that space charge can be used to control motion of ions in the Q-pole region in a quadrapole mass spectrometer, as recited in Claim 11.

Regarding Claims 13 and 14, Thomson as applied to Claims 1-12 above, discloses a quadrupole (Q-pole) mass spectrometer, wherein there is no requirement to operate at

the resonant frequency of the ions, or even at a harmonic of the resonant frequency; the axial field excitation can; for example, be a square wave. Without substantial loss the ions can be axially oscillated about their equilibrium positions. The axial oscillation described can be useful not only for fragmenting large ions, but also for dissociating oxide ions in inductively coupled (as recited in Claim 14) plasma applications (where the ion source is a plasma), and for other ions. See Column 13, line 65-67, and Column 14, line 1-13. It is well known in the art to utilize a magnetic field in mass spectrometers, wherein ion motion is "carried out using the Lorentz force", as recited in Claim 13.

Conclusion

5. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (703) 305-7022. The examiner can normally be reached on Monday-Friday from 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (703) 308-4116. The fax phone numbers are (703) 308-2864 and (703) 308-7721.

PJ
October 21, 2002

JOHN R. LEE
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